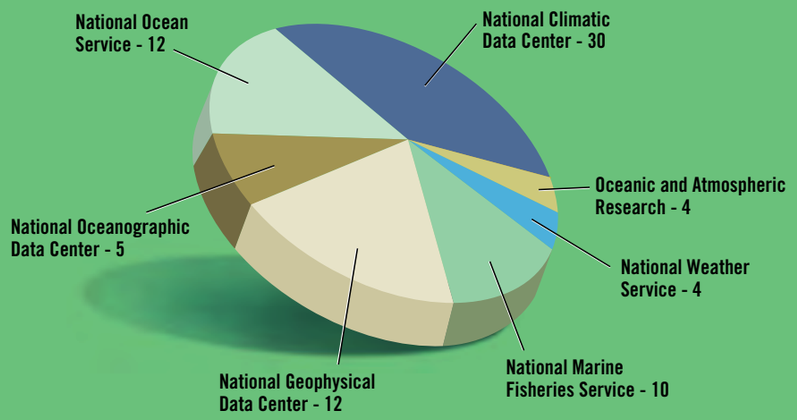
CLIMATE DATABASE MODERNIZATION PROGRAM

ANNUAL REPORT 2008

National Oceanic and Atmospheric Administration
National Environmental Satellite, Data, and Information Service
National Climatic Data Center
Asheville, North Carolina

FY08 TASK BY NOAA ORGANIZATION

Total Number of NOAA CDMP projects has reached 77 in 2008



CDMP continues to make immeasurable contributions to the field of climate research. But our work is far from done. Millions of pieces of data are still waiting to be digitized, and the scientific community is depending on CDMP to ensure that hard-earned, irreplaceable research is protected and preserved.

CDMP – Supporting NOAA's Stewardship Commitment

A CDMP contractor at Information Manufacturing Company, LLC in Rocket Center, WV prepares a delicate page of historic weather observations for imaging.

The Climate Database Modernization Program (CDMP) supports the National Oceanic and Atmospheric Administration's (NOAA) mission to collect, integrate, assimilate and effectively manage Earth observations on a global scale, ranging from atmospheric, weather, and climate observations to oceanic, coastal, and marine life observations. Many of these holdings, which are part of the U.S. National Archives, were originally recorded on paper, film, and other fragile media, and stored at various NOAA Centers. Prior to CDMP, not only were these valuable data sources mostly unavailable to the scientific community, but storage technology for the archives was not state-of-the-art. Without proper preservation of the media, the information they contained was in danger of being lost forever.

Today, CDMP has greatly improved the preservation and access to NOAA's holdings by migrating many of these resources to new digital media. Digital images of many of the holdings are now available online, and millions of historic data records have been keyed and integrated into digital databases. CDMP projects span the full spectrum of NOAA, supporting all five line offices. CDMP also works with U.S. regional climate centers, state climatologists, the U.S. Air Force, the World Meteorological Organization, and foreign meteorological services in Europe, Africa, Asia, and the Americas. These NOAA efforts benefit researchers and data users throughout the nation and worldwide. The increase in data accessibility and the inclusion of these historical data sets into the integrated global databases needed by today's climate and environmental data users support the CDMP mission: to make major climate and environmental databases available via the World Wide Web.

Major CDMP Tasks 2008

National Climatic Data Center

Hourly Surface Observations: imaging and keying
Daily Cooperative Observations: imaging and keying
Upper-Air Observations: imaging and keying
Signal Service/Smithsonian Obs ("Forts"): keying
Hourly Precipitation Data: imaging and keying
Integrated Inventory System Development
Marine Observations: keying
Mexican Daily/Hourly Data: imaging and keying
Vietnamese Daily/Hourly Data: keying
Monthly Weather Review: searchable indexing
Snotel Data: keying
East India Company Data: keying
Station History & Metadata Development
Subscription Services

National Oceanographic Data Center

NOAA Library Rare Climate Publications: imaging
Lightship Data: Sweden & Finland
NOAA 200th Anniversary Film Transfer: imaging
California Marine Ecosystems Survey: imaging

National Weather Service

African Upper-Air Observations (Seven Nations): keying
Surface Data from Tanzania, Mozambique: imaging and keying
Atlantic/Pacific tropical cyclone "storm wallets": imaging

Office of Oceanic and Atmospheric Research

U.S. Navy Weather Station Index Books: keying
Hurricane Reconnaissance: imaging & streaming video
European Historical Ship Logbooks: imaging and keying

National Geophysical Data Center

Defense Meteorological Satellite Program Film: imaging
Glacier Photos: imaging
Marine Geophysical Records: imaging and keying
Ionospheric Observations: keying
Historical Solar and Spectral Observations: imaging
Tsunami Event Gauge Records: imaging and keying
Historic International Polar Year: imaging
Marine/Lacustrine Record of Climate Change:
Heat Mapping Mission Data:
Historic Cosmic Ray Ionization Chamber Data
Historical International Polar Year: imaging

National Ocean Service

Shoreline Charts: vectorizing
Nautical Charts: imaging
Thunder Bay Historical Collections: imaging and keying
California Marine Ecosystem Survey: imaging and keying
Historical Maps and Nautical Charts: geolocation
Historic Environmental Sensitivity Maps: imaging
Fish Commission Historical Papers/Logbooks: imaging, and keying
High/Low Water Level at NOS Sites: imaging, indexing, and keying
Special Reports for Geographic Names: imaging
Historical Aerial Photography: imaging

U.S. Regional Climate Centers

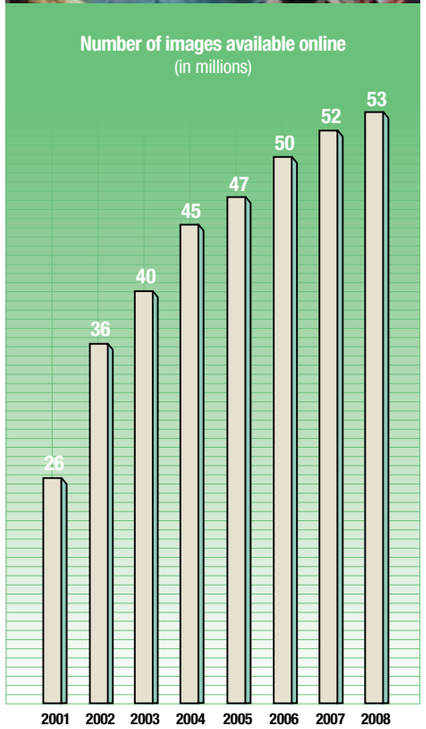
Database Conversion and Quality Control




CDMP: Nine Successful Years

The National Oceanic and Atmospheric Administration's Climate Database Modernization Program has just completed its ninth year. The demand for rapid and complete access to the nation's and world's climate data by researchers and global change scientists was a key motivation in the establishment of CDMP, which is managed through NOAA's National Climatic Data Center (NCDC) located in Asheville, NC. This program was initiated by Congress to assist NOAA in modernizing and improving access to the Nation's climate data and information.

Partnering with four private sector contractors, CDMP has placed online around 53 million weather and environmental images, available to researchers around the world via the Internet. The amount of data online has grown from 1.75 terabytes in 2001 to over 10 terabytes in 2008. Major progress continues in making these data available through a number of NOAA web sites (see URL list on inside back cover). In addition, hourly weather records keyed through CDMP continue to be integrated into NCDC's digital database holdings, extending the period of record for many stations back into the 1890's. Additional daily data records keyed through the CDMP "Forts" project will soon extend this data period back to the 18th Century for several stations. CDMP has also enabled the keying of other important NOAA environmental data, ranging from below the oceans to the top of the ionosphere. The increase in the quality and quantity of historical data is helping researchers worldwide to improve real-time monitoring and forecasting of environmental, solar and geophysical events.



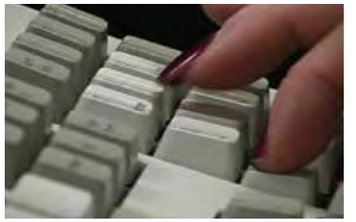
CDMP projects have created hundreds of new private sector data entry/information management jobs in several economically challenged areas in West Virginia, Kentucky and Maryland.







NOAA's CDMP Project Partners



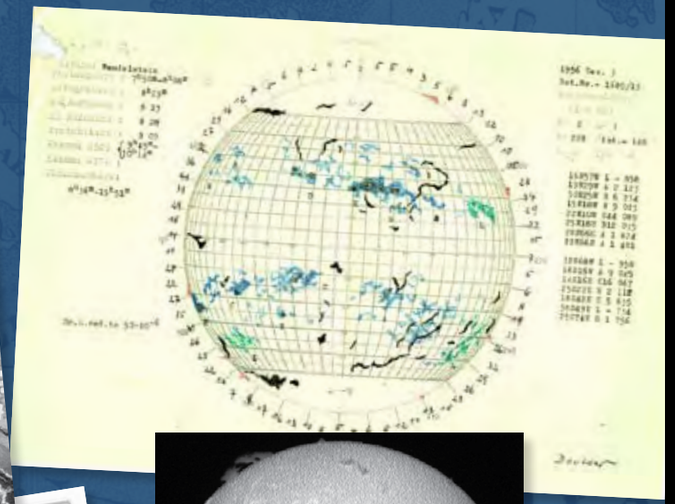
The CDMP could not exist without the extraordinary efforts of people within NOAA and those in the private sector who do the keying, imaging, and database development. CDMP projects have created hundreds of new private sector data entry and information management jobs in several economically challenged areas in West Virginia, Kentucky, and Maryland. The project tasks supported by CDMP are well suited for the private sector. Many of these tasks have been shifted from government employees to CDMP contractors in the above mentioned states. Tasks performed by these contractors include the printing and distributing of the NCDC serial climate publications, managing accounts receivable, imaging and keying incoming records, hosting and maintaining online images, and providing expert personnel in support of various projects.

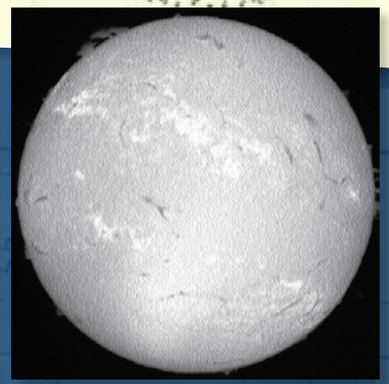
The three prime contractors for CDMP are Information Manufacturing Company, LLC, Rocket Center, West Virginia; SourceCorp, Mount Vernon, Kentucky; and HOV Services, Beltsville, Maryland. Excellent support is also provided by the NCDC on-site contractor, STG Corporation, whose staff prepares many of the data for shipment and performs extensive quality control on the returning data products. With over 75 projects ongoing, the contractors must remain focused and flexible to meet each project's requirements.

HOVServices Exceed Expectations · Information Manufacturing Company, LLC · SOURCECORP · STG

CDMP Goes Online

Selected images highlight several CDMP tasks (page 2).
Upper left: *Tsunami Event Gauge Records* - aerial photo of Hawai'ian tsunami damage; digitized tsunami-event records helped members of NOAA's National Geophysical Data Center win a 2008 NOAA Silver Medal for Personal and Professional Excellence.
Bottom left: *Signal Service/Smithsonian Obs ("Forts")* - some of the 300+ "Forts" 19th-Century weather stations keyed through 2008.
Right: *Historic Solar and Spectral Observations* - imaged historical solar flare drawings (top right) and telescopic solar images (bottom right) help scientists understand solar flare and sunspot cycles.





CDMP – Forging International Relationships

CDMP program manager Tom Ross (front row, third from left) represented all of North America in Mali, Africa at the May, 2008 international meeting of the Expert Team on the Rescue, Preservation, and Digitization of Climate Records.

Over the last decade, CDMP has become known for supporting an array of international programs in data modernization. Further evidence of the program's global reach was CDMP's representation at the international meeting of the Expert Team on the Rescue, Preservation and Digitization of Climate Records, held May, 2008 in Bamako, Mali in Africa. The meeting was sponsored by the World Meteorology Organization's (WMO) Commission for Climatology.

CDMP program manager Tom Ross served as the WMO Expert Team Leader and Chair of the meeting, which was attended by leading data rescue experts from six continents, along with WMO Secretariat Hama Kontongomde. Each WMO region's representative made a presentation of their region's advances in data rescue and modernization, with Tom Ross representing all of North America. The Team also exchanged exciting ideas and thoughts in various round table discussions.

The Expert Team's set of ten recommendations were presented for WMO consideration, and will help shape how scientists handle the task of rescuing and modernizing data worldwide. In the years to come, CDMP will continue to play its current influential role in the shaping of this international opinion and policy, and to support data rescue efforts and projects that contribute to the program's core mission from around the world.

CDMP Ventures "North to Alaska"

above: A scientist at the Alaska Fisheries Science Center displays her prize, a large red king crab.

bottom right: A trawl net full of fish from an Alaska Fisheries Science Center catch survey.

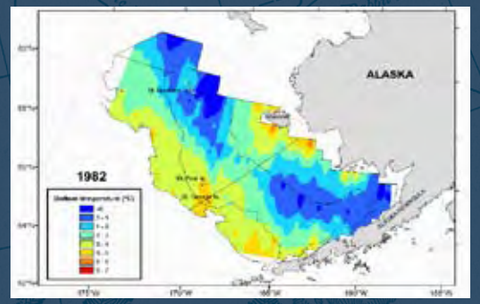
Figuratively speaking, there may be no "hotter" spot right now for climate and environmental scientists than Alaska. Still pristine, yet with scientific records dating back longer than many other high latitude regions, our 50th state's data have become more important than ever. Via several projects, CDMP is doing its part to make a wide range of valuable Alaskan climate and environmental data available to the scientific community.

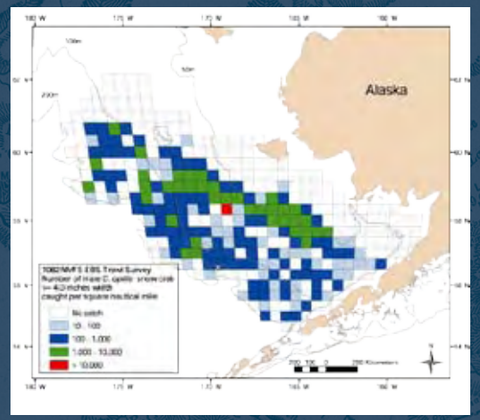
CDMP keying tasks are converting years of historical weather observations from Alaska into a digital format, compatible with climate change models and available for other important research. Historic U.S. Weather Bureau observations from ten Alaskan stations have already been keyed and added to NCDC's digital database, dating back as far as 1898. In 2008, even older observations from some 25 U.S. Army Signal Service Alaskan stations were discovered and keyed. These rare daily weather data span the period from the late 1870's through the late 1880's. Without CDMP, these crucial Alaskan climate data would likely still be stored away in boxes and on microfilm reels.

More Alaskan environmental data recovery projects currently underway provide evidence of CDMP's reach beyond climate data. In 2008, CDMP continued its work helping to digitize important Alaskan glacier pair photographs and make data and images related to the International Polar Year widely available (see URLs on inside back cover). Two other projects, one new to CDMP in 2008, each involve the retrieval of vital environmental data from beneath – and above – Alaska's frigid seas.

CDMP sponsors two projects through the Alaska Fisheries Science Center (AFSC), a branch of NOAA's National Marine Fisheries Service. AFSC hosts an online database of eastern Bering Sea crab populations. These data provide information critical to both commercial fishing interests and to those hoping to understand area ecosystems. They also include sea floor temperatures and even surface weather observations. However, years of data collected prior to 1975 were not accessible to researchers, existing on paper records only: a critical hole in the dataset's continuity. Beginning in 2008, these historic data are being keyed through CDMP, and will soon be integrated into the AFSC database (www.afsc.noaa.gov/kodiak/shellfish/crabebs/crabsurvey.htm).

Another group within AFSC tracks populations of groundfish species via annual trawl surveys throughout the Bering Sea, Aleutian Islands, Gulf of Alaska, and along the Pacific Coast. Biomass estimates based on these data are an essential component of area fisheries management. Previously found only on a half-million deteriorating paper records – and representing a telling gap in evidence about the possible effects of climate change on the region's marine populations – survey records from 1974 and earlier are being imaged and their data keyed via CDMP. Integrated into a new relational database, these important survey data will soon be available online to researchers across the globe.





Trawl survey data are being digitized by CDMP to help generate maps like these (showing ocean floor temperatures and corresponding snow crab catch data from 1982) for the period prior to 1975.

CDMP Helps Unlock Secrets of the "Dust Bowl"

Not all natural disasters take their toll in a few moments, or even a few days. The decade-long "Dust Bowl" droughts of the 1930's in the midwestern United States marked one of this country's most devastating social and economic catastrophes. Climate scientists continue to investigate the atmospheric factors that contributed to this prolonged drought period. But this research has been limited to surface observations only, which paints an incomplete picture of the three-dimensional atmosphere. Now, researchers are constructing more complete reanalyses of the Dust Bowl-era atmosphere using historical upper-air data made available through CDMP.

Launching a pilot balloon to take upper-air wind observations. Data from launches like these are helping reconstruct upper-air conditions during the Dust Bowl era. (credit: NOAA's National Weather Service Collection)

background image: Dust Bowl-era dust storm approaching Stratford, Texas. (credit: NOAA George E. March Album)

Through the first half of the 20th century, "pibal" (short for "pilot balloon") launches were made across the United States. These launches provided information about wind profiles over the lower several kilometers of the atmosphere. For years, these valuable data resided only on microfiche on a few basement shelves. Now thanks to CDMP, the pibal data have been keyed, and Swiss researcher Dr. Stefan Brönnimann of the Institute for Atmospheric and Climate Science in Zurich is using the new dataset in his study of the 1930's midwestern U.S. atmosphere.

In one analysis, Dr. Brönnimann compares winds aloft during the Dust Bowl era with periods before and after. His findings are preliminary, but the data provided by CDMP suggest some intriguing differences in the upper-air flow. This important research may one day help us predict and mitigate potential future droughts, and it would not be possible without the CDMP program.

A tractor is literally buried by dust and sand circa 1935, (credit: NOAA's National Weather Service Collection)

Gauging Effects of Pacific Ocean "Climate Change"

When we consider "climate change," we usually think of rising air temperatures and changes in rainfall patterns. But our planet's oceans have their own " climate," and changes in the marine environment have a far reaching effect on life under the seas. At the same time, the oceans are a prime driver for atmospheric changes and variability. With the help of CDMP, scientists at NOAA's National Marine Fisheries Service/ Southwest Fisheries Science Center (SFSC) are assembling a new dataset to help gauge how changes in ocean temperature may be affecting marine species.

Data collected since 1970 by the SFSC has suggested a link between Pacific Ocean temperatures and the populations of West Coast fish species, especially commercially important sardines. But the data period was too short to draw definitive conclusions. Now, thanks to CDMP, thousands of pages of historical fish landing data, which detail commercial fishing catch sizes, have been keyed back through the 1930's. According to SFSC researchers, preliminary examination of the data shows large changes in the commercial distribution of several important fish species, changes which indeed appear related to changes in ocean temperature. These data will be extremely valuable in understanding how these changes have affected the distribution and development of commercial and recreational fisheries. Even more importantly, they may lead to methods of predicting how West Coast fisheries may be affected by future climate change.

Fishermen mending their nets in San Francisco, 1891. Historical fish catch data from all along the U.S. West Coast are being keyed through CDMP.
(Courtesy: NARA U.S. Fish Commission collection)

Web Addresses for NOAA Organizations:

Climate Database Modernization Program
www.ncdc.noaa.gov/oa/climate/cdmp/cdmp.html

National Oceanic and Atmospheric Administration (NOAA)
www.noaa.gov

NOAA's National Environmental Satellite, Data, and Information Service (NESDS)
www.nesdis.noaa.gov

NOAA's National Climatic Data Center (NCDC)
www.ncdc.noaa.gov

NOAA's National Geophysical Data Center (NGDC)
www.ngdc.noaa.gov

NOAA's National Oceanographic Data Center (NODC)
www.nodc.noaa.gov

NOAA's National Ocean Service (NOS)
www.nos.noaa.gov

NOAA's National Marine Fisheries Service
www.nmfs.noaa.gov

NOAA's National Weather Service
www.nws.noaa.gov

NOAA's Office of Oceanic and Atmospheric Research
www.oar.noaa.gov

Selected Project Specific URL's

NOAA Shoreline Data Explorer
www.ngs.noaa.gov/RSD/shoredata/NGS_Shoreline_Products.htm

Defense Meteorological Satellite Program (DMSP)
www.ngdc.noaa.gov/dmsp/index.html

NOAA CENTRAL LIBRARY IMAGING PROJECTS
International Polar Year
www.lib.noaa.gov/collection/ipy.html

Why the Weather?
docs.lib.noaa.gov/rescue/whytheweather/whytheweather.html

National Snow and Ice Data Center Glacier Pairs
nsidc.org/data/glacier_photo/repeat_photography.html

Alaska Fisheries Science Center
www.afsc.noaa.gov

Southwest Fisheries Science Center
swfsc.noaa.gov

Chinese fishery, Monterey, CA (Courtesy: NARA U.S. Fish Commission collection)